

Engineering Report  
on  
**REGIONALIZED NEEDS and COSTS**  
**of WATER SUPPLY and**  
**WASTEWATER FACILITIES**  
**in DIMMIT and ZAVALA COUNTIES**

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TWDB

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**INTRODUCTION**

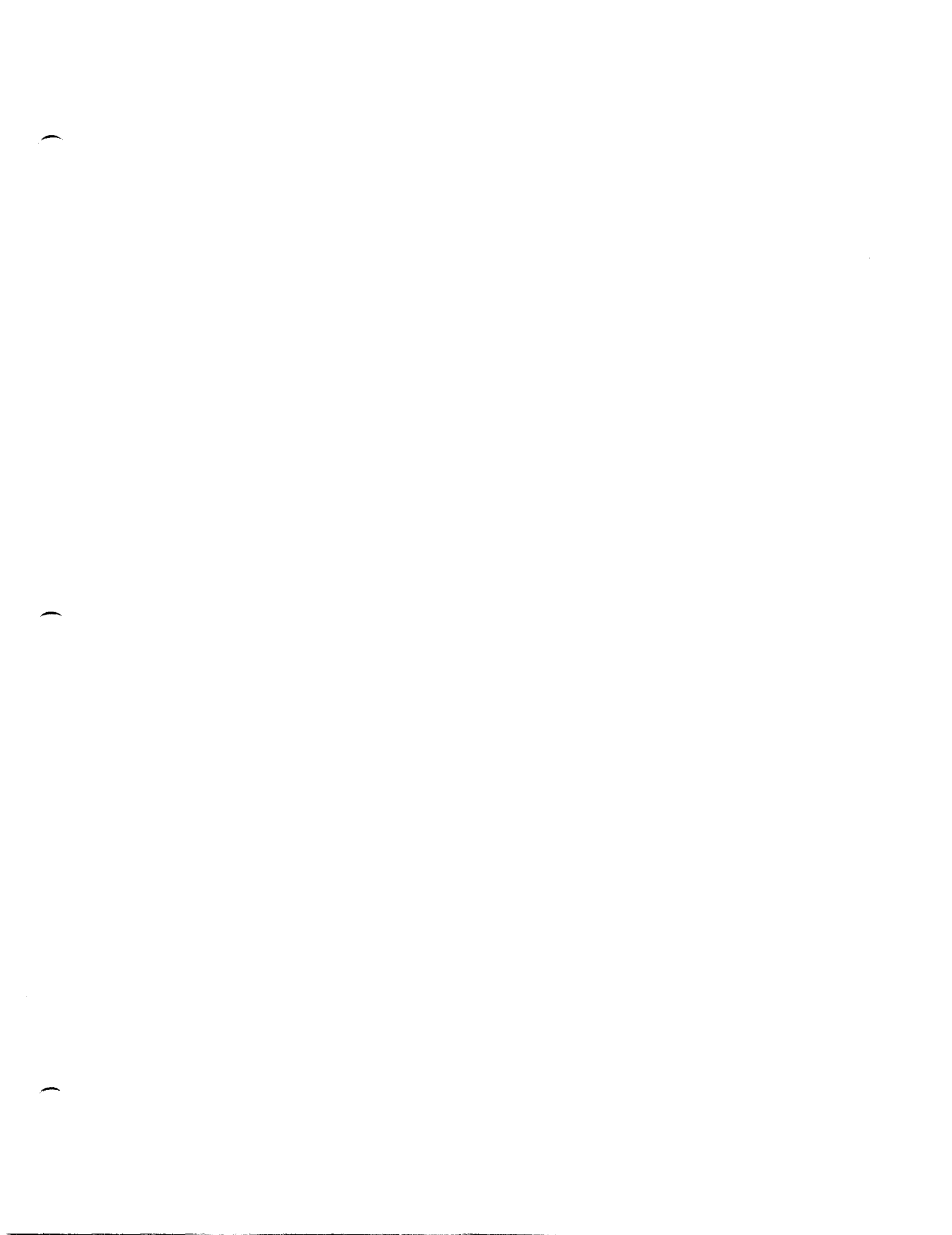
The main purpose of this report is to gather information and prepare cost estimates which will allow the applicant, county governments, local municipal governments and any other interested participants to establish goals for providing a water supply and wastewater facility needs to those colonias and other areas within Dimmit and Zavala Counties. It is the intent of this document to present a comprehensive regional plan with costs figures to be utilized in making decisions for implementation.

This report has several important phases that are critical for decision making by those political entities responsible for each entity. This report includes an evaluation of existing water supply and wastewater facility needs and proposed alternatives and their costs, population projections for each county and individual city or town, a water conservation plan for each county and financial plans for implementation.

One of the major problems, in implementing the proposed water and sewer improvements, is the financial support. The Texas Legislature has authorized the sale of \$100 million in bonds to be specifically targeted for water and sewer improvements in "Colonias" along the US Mexican border areas and it is anticipated that the U.S. Congress will also authorize \$100 million in grants for the "Colonias" project.

This report contains maps of each town or colonia with the proposed water or sewer improvements. These maps also include housing counts and the size and location of the proposed sewer or water lines. These maps are preliminary but will be useful for future development planning for each study area.

The intent to develop a regional plan to serve the water and sewer needs of the study areas has been addressed and will be completed upon your review and comments.



**EVALUATION OF WATER SUPPLY,  
WASTEWATER FACILITY NEEDS  
AND  
PROPOSED IMPROVEMENTS**

**DIMIT COUNTY**

**ASHERTON**

**WATER** - The City of Asherton has 520 residences and an estimated population of 1,560 persons. The City has one water well, an elevated water storage tank and a water distribution system. The water distribution system has a considerable linear footage of two (2") inch mains that need to be replaced. With the advent of a new water well and a new elevated water storage tank, new water line improvements plus the addition of fire hydrants will correct low water pressure problems and will provide ample fire protection to the entire City of Asherton.

**SEWER** - The City of Asherton has a wastewater treatment system consisting of facultative and aerobic stabilization ponds designed to serve a future population of 2,061 persons by the year 2020. The existing wastewater treatment facility is presently serving approximately 520 residences. The nature of the sewage is typically domestic and it is anticipated that the nature of the influent will not change during the next 30 years. Upon review of the existing sewage collection system and wastewater treatment facilities, we can recommend that no improvements need to be made to the existing wastewater facilities.

**BIG WELLS**

**WATER** - The City of Big Wells has an antiquated water distribution system, a new well and an elevated water storage tank. The City has made several major repairs to the system in replacing two (2") inch mains. The water distribution system needs some lines to be replaced and a loop circuitry completed, additional fire hydrants and a ground storage tank to provide ample fire protection. The existing water system has two (2) water wells and an elevated water storage tank. The storage capacity is short of minimum requirements and there is a need for additional ground storage. The present water system has 269 services and has suffered from low water pressure and a leaking well casing in past years. We recommend that the existing water distributing system be improved and that a ground storage tank and fire hydrants be added to upgrade the system.

**SEWER** - The City has a wastewater treatment plant under construction consisting of facultative and aerobic stabilization ponds designed to serve a future population of 1980 persons by the year 2020. The existing wastewater treatment facility is presently serving approximately 269 residences or a present population of 887 persons. The nature of the sewage is typically domestic and it is anticipated that the nature of the influent



will not change during the next 30 years. Upon review of the existing sewage collection system and wastewater treatment facilities, we can recommend that no improvements need to be made to the existing wastewater system.

**CARRIZO HILLS**

**WATER** - Carrizo Hills is a colonia adjacent to the city limits of Carrizo Springs. The area has been subdivided with no utilities. The City of Carrizo Springs has an existing ten (10") inch water main located on the South right-of-way of State Highway 85 and is approximately 2,400 feet from the Carrizo Hills area. The Carrizo Hills area has 120 residences with an estimated population of 396 persons and no potable water distribution system.

The entire area needs to connect to the existing Carrizo Springs water system for a water supply source and install a looped water system to service all residents. The installation of fire hydrants and a ground storage tank will provide fire protection to the entire area. The existing Carrizo Springs water supply system has 3.1 million gallons of water ground storage tanks, 0.55 million gallons of elevated storage tanks and three (3) water wells. The existing water supply and 2.0 million ground storage tanks are near the Carrizo Hills area. It is our opinion that the area can adequately be supplied with water from the City of Carrizo Springs water system.

**SEWER** - This area has no sewage collection system and the area slopes from South to the North with an approximate slope of three (3%) percent . The City of Carrizo Springs has a lift station located approximately 700 feet from the Carrizo Hills area at the North end of Carrizo Hills and being located near the intersection of FM 1917 and US Hwy 83. The existing Carrizo Springs wastewater treatment plant has a maximum capacity of 2.5 MGD. This capacity will adequately handle wastewater for a population of 24,000, the present population being approximately 8,100. The addition of Carrizo Hills to the present system will not cause any overload problem. The site is on a slope towards the City of Carrizo Springs and lends itself to a gravity flow sewage collection system. The sewage collection system will deliver to an existing lift station for delivery to the existing wastewater treatment plant. The lift station will then transport the effluent via a pressure line to an existing twelve (12") inch gravity flow sewer main line, then to the wastewater treatment plant.

**CATARINA**

**WATER** - The town of Catarina has a total of 72 residences and an approximate population of 238 persons. The existing water distribution system consists of one well, a ground storage tank and a network of an eight (8") inch water main feeding into six (6") inch water mains that branch off into two (2") inch water mains that serve as the main system distribution network. The existing system has a few fire hydrants which are spread out and would be useless in fighting a blaze. The existing pipes are a combination of steel pipe, PVC pipe and AC pipe. The owner of the Catarina Water Works refuses to repair any leaks along any construction route. The entire system including the well, water storage and pipe network needs to be abandoned and an entire new system needs to be constructed. A new system can be designed to provide adequate water pressure and to also provide ample fire protection. It is recommended that a new well be drilled, a water storage tank be added and a new water distribution system be constructed.

**SEWER** - Catarina has no wastewater treatment facility and no sewage collection system. The town slopes to the Northeast and has a difference in elevation of 80 feet from the lowest elevation at the Northeast corner of Catarina and the high point being at the Southwest corner of Catarina. The entire town can be served by gravity flow line.

It is recommended that manholes and cleanouts be installed to facilitate the removal of any obstruction or blockage in the sewer mains. The sewage collection system will be designed to handle maximum flow for a population projection to the year 2020. The outfall pipe will be sized accordingly to deliver to a proposed stabilization pond wastewater treatment plant also sized for the year 2020. It is proposed to lay all sewer lines along the alley right-of-way and to minimize the number of open cuts at the existing paved streets.

**EVALUATION OF WATER SUPPLY,  
WASTEWATER FACILITY NEEDS  
AND  
PROPOSED IMPROVEMENTS**

**ZAVALA COUNTY**

**BATESVILLE**

**WATER** - The town of Batesville has 357 residences with an approximate population of 1,178 persons. The town has an existing water distribution system and an elevated water storage tank that is in very good condition.

**SEWER** - The town of Batesville has no sewage collection system and no wastewater treatment plant. The town of Batesville has a very gentle slope to the South. The development of Batesville is from North to South along the old Loma Vista Road and FM 117. To minimize the number of highway borings, a linear parallel system of collection lines, on each side of the road, has been proposed with delivery of the effluent to the West of FM 117. The effluent will be delivered to a proposed 20 acre facultative pond and aerobic pond wastewater treatment plant. After treatment, the effluent will be discharged to a slough being about 40,000 feet or eight (8) miles away from the Leona River basin. The town of Batesville has few recorded subdivision plats and no alleys, therefore, all sewer mains are proposed to be located along the centerline of the existing street right-of-way. The population of Batesville has gradually increased and provisions have been made to accommodate future growth. The location of the proposed wastewater treatment plant is in the Southwest quadrant of the town and the prevailing winds from the Southeast will carry any noxious odors away from the populated area of the town.

**CHULA VISTA**

**WATER** - This area is a colonia located South, 1.5 miles from the South city limits of the City of Crystal City and is comprised of two (2) areas, one being Chula Vista Subdivision and the River Spur addition for a total of 281 lots. This colonia presently has 98 residences for an estimated population of 323 persons and a potential growth population of 927 persons. The area has limited water services to a few homes from a two (2") inch main.

The Chula Vista area has no fire protection and has a need for a new, complete water distribution system with fire hydrants and with a 60,000 gallon ground storage tank with two (2) pumps. The proposed looped water distribution system with fire hydrants will provide the area with an ample supply of water and with good pressure, providing adequate water to combat any fire within the subdivision. It is proposed to connect to the City of Crystal City water supply and pump to a ground storage tank, then exit to a pump and going into the Chula Vista water distribution system. The existing subdivision has no alleys and no utility easements, therefore, all utilities have to be located within the street right-of-way. It would be too costly to have a parallel system along the existing paved streets, therefore, allowance should be made to resurface the paved streets after the utility trenches have settled and compacted.



**SEWER** - This colonia has no wastewater collection or treatment plant. It is proposed to install a collection system and a 30,000 GPD packaged wastewater treatment plant. The terrain has a slope from West to East towards the Southeast corner of this study area. It is proposed to install a gravity flow collection system feeding directly to a packaged wastewater treatment plant which will then discharge effluent meeting Texas Water Commission discharge standards directly into a tributary of the Nueces River. The study area has a natural slope to the Southeast and is downstream from the existing City of Crystal City sewage collection system located approximately 7,500 feet North of the Chula Vista area along 7th Street. An alternative would be to design a gravity flow system delivering to a lift station and then to be pumped under pressure to an existing manhole being 7,500 feet North from the Chula Vista area. A series of lift stations and a pressure line, extending to an existing manhole being 7,500 feet North of Chula Vista, would be required to deliver the effluent to the wastewater treatment plant of the City of Crystal City.

Our recommendation is to install a gravity flow sewage collection system and install a 90,000 GPD packaged wastewater treatment plant and being located at the Southeast corner of the Chula Vista study area.

**LA PRYOR**

**SEWER** - The town of La Pryor has an existing water distribution system and no sewer collection system. There are 541 houses with an estimated population of 1,785 persons. It is projected that La Pryor will grow to a population of 2,200 persons in the year 2020. The town has a FM road network criss crossing the town from North to South and East to West and US Hwy 83 on the West side of La Pryor. The terrain has a very gentle slope to the South. All of the inhabited areas can be served by sewer lines being located along the alleys.

It is proposed to have two (2) main collection mains delivering to the South and the dividing line being Pryor Street. All effluent flow will be delivered to a lift station and then the pressure main will deliver to a facultative and aerobic pond wastewater plant. The double spline collection trunklines will minimize the underground boring and casing areas US Hwy 57, Tx Hwy Loop 305 and US Hwy 83. The wastewater pond site shall be 20 acres to handle any anticipated growth in the future.

**LOMA ALTA**

**WATER** - Colonia Loma Alta is located 6,000 feet North of the city limits of the City of Crystal City. The area has a total of 155 lots and a potential population of 512 persons. At present, there are 32 residences with an estimated population of 106 persons. The danger of drinking contaminated water is ever present in an area having to haul water for domestic use. There are no wells and no water distribution system. It is proposed to construct a complete loop system with fire hydrants and connect to a proposed water main trunkline to be located on the East right-of-way of US Hwy 83.

An alternative to this initial proposal is to drill a well and also construct a 50,000 gallon ground storage tank with a pump to a closed loop system with fire hydrants. The alternative will be the least advantageous to the area. The initial proposal will void the drilling of a well and the addition of a 50,000 gallon ground storage tank. The area is too far North from an available water supply from the City of Crystal City. The water source from the City of Crystal City would require the extension of a service water trunkline with the addition of a ground storage tank and booster pumps to achieve an acceptable degree of water pressure for domestic services and to also provide fire fighting capabilities.

**SEWER** - This colonia has no sewage collection system or treatment facility. The area is served by pit privies which are a constant health hazard. The area has a potential population of 512 persons and the danger of pollution is ever present unless positive steps are taken to collect the sewage and deliver to a distant point for treatment. It is proposed to construct a gravity flow sewage collection system and connect to a proposed collection main to be located on the East right-of-way of the old Hwy 83. The effluent will then be delivered to the City of Crystal City wastewater treatment plant. An alternative would be to construct a facultative and aerobic pond wastewater treatment plant to be located West of the railroad right-of-way, having an area of ten (10) acres. Loma Alta is located North of the City of Crystal City and the natural slope of the terrain is towards the Southwest in the direction of the existing wastewater treatment plant. The area is above the flood plain of the Nueces River and attractive for building a home if utilities were available.

**CONSTRUCTION COST ESTIMATES  
OF STUDY AREAS IN  
DIMMIT AND ZAVALA COUNTIES**

**WATER SYSTEM IMPROVEMENTS**

**Cost Estimate Parameters:**

To estimate the construction costs, we obtained unit prices for materials and labor from contractors and cities presently constructing similar types of utilities. Also, some items were estimated on similar types of construction presently under bid and under construction within this regional area. Unit prices presently are depressed due to the weak economy, however, the prices used are competitive and should not change until early 1990. Other sources of cost prices were direct calls to suppliers.

In summary, we have previous and present history data, contractor quotes, cities cost data and suppliers quotations. All cost estimates do not include mobilization, preparing right-of-way, and a contingency amount. These cost figures reflect materials and labor in place only to meet the Davis-Bacon Act requirements.

**CITY OF ASHERTON**  
**WATER SYSTEM IMPROVEMENTS**

**Cost Estimate:**

The City of Asherton has an existing water distribution system that has had problems of low pressure and inadequate fire protection in some areas. It is our recommendation to eliminate the two (2") inch water distribution lines and replace with a minimum size of six (6") inch water lines and additional fire hydrants for fire protection.

CITY OF ASHERTON

WATER SYSTEM IMPROVEMENTS

<u>Description</u>	<u>Unit</u>	<u>Quantity</u>	<u>Unit Price</u>	<u>Amount</u>
6" Water Line	L.F.	32,280	\$ 8.00	\$258,240.00
6" Gate Valve	EA.	30	325.00	9,750.00
Fire Hydrants	EA.	8	1,350.00	10,800.00
3/4" Service Line	L.F.	7,480	4.00	29,920.00
5/8" Water Meter	EA.	187	65.00	12,155.00
Water Meter Assembly	EA.	187	60.00	11,220.00
Service Taps	EA.	187	45.00	8,415.00
Air Release Valve	EA.	5	650.00	3,250.00
Cast Iron Fittings	TON	8	2,000.00	16,000.00
Hydrostatic Testing	L.S.	1	2,500.00	2,500.00

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WATER DISTRIBUTION CONSTRUCTION COSTS \$362,250.00

CITY OF ASHERTON  
WATER SYSTEM IMPROVEMENTS

TOTAL WATER DISTRIBUTION CONSTRUCTION COSTS:

Water Supply	-0-	
Distribution System	\$362,250	
Contingency	18,112	
		<hr/>
Total Construction Cost	\$380,362	
Engineering		35,319
Financial		-0-
Legal		3,622
Administration		7,244
Land		-0-
Other		-0-
		<hr/>
<u>TOTAL PROJECT COST</u>		<u>\$426,547</u>



**CITY OF BIG WELLS**  
**WATER SYSTEM IMPROVEMENTS**

**Cost Estimate:**

The City of Big Wells has an existing water distribution system with very limited capabilities. The water distribution system needs several improvements. The water distribution system needs additional fire hydrants and a ground storage tank with pumping facilities to maintain adequate water pressure.

CITY OF BIG WELLS  
WATER SYSTEM IMPROVEMENTS

<u>Description</u>	<u>Unit</u>	<u>Quantity</u>	<u>Unit Price</u>	<u>Amount</u>
6" Water Line	L.F.	20,600	\$ 8.00	\$164,800.00
6" Gate Valve	EA.	16	325.00	5,200.00
Fire Hydrants	EA.	9	1,350.00	12,150.00
3/4" Service Line	L.F.	3,540	4.00	14,160.00
5/8" Water Meter	EA.	30	65.00	1,950.00
Water Meter Assembly	EA.	30	60.00	1,800.00
Service Taps	EA.	30	45.00	1,350.00
Air Release Valve	EA.	2	650.00	1,300.00
Cast Iron Fittings	TON	3	2,000.00	6,000.00
Hydrostatic Testing	L.S.	1	1,000.00	1,000.00
65,000 Gal. Storage Tank	EA.	1	65,000.00	65,000.00
Pump House and Pump Facilities	L.S.	1	30,000.00	30,000.00
Electrical Controls	L.S.	1	5,000.00	5,000.00
Plant Piping	L.S.	1	8,000.00	8,000.00
Telemetry System	L.S.	1	18,000.00	18,000.00
<b>WATER DISTRIBUTION CONSTRUCTION COSTS</b>				<b>\$335,710.00</b>

CITY OF BIG WELLS  
WATER SYSTEM IMPROVEMENTS

TOTAL WATER DISTRIBUTION CONSTRUCTION COSTS:

Water Supply	-0-	
Distribution System	\$335,710	
Contingency	16,786	
		<hr/>
Total Construction Cost	\$352,496	
Engineering		32,732
Financial		-0-
Legal		3,357
Administration		6,714
Land		-0-
Other		-0-
		<hr/>
<u>TOTAL PROJECT COST</u>		<u>\$395,299</u>

**CARRIZO HILLS**  
**WATER SYSTEM IMPROVEMENTS**

**Cost Estimate:**

This colonia is adjacent to the city limits of the City of Carrizo Springs and has no existing water distribution system facilities. It is proposed to construct a water distribution system and connect to the existing Carrizo Springs water system. The proposed water system improvements also include fire hydrants and a ground storage tank with pumping facilities to maintain adequate water pressure.

CARRIZO HILLS

WATER SYSTEM IMPROVEMENTS

<u>Description</u>	<u>Unit</u>	<u>Quantity</u>	<u>Unit Price</u>	<u>Amount</u>
10" Water Line	L.F.	2,400	\$ 14.00	\$33,600.00
8" Water Line	L.F.	2,700	11.00	29,700.00
6" Water Line	L.F.	22,000	8.00	176,560.00
10" Gate Valve	EA.	2	800.00	1,600.00
8" Gate Valve	EA.	3	525.00	1,575.00
6" Gate Valve	EA.	20	325.00	6,500.00
Fire Hydrants	EA.	53	1,350.00	71,550.00
3/4" Service Line	L.F.	7,000	4.00	28,000.00
5/8" Water Meter	EA.	141	65.00	9,165.00
Water Meter Assembly	EA.	141	60.00	8,460.00
Service Taps	EA.	141	45.00	6,345.00
Air Release Valve	EA.	3	650.00	1,950.00
Cast Iron Fittings	TON	8	2,000.00	16,000.00
Hydrostatic Testing	L.S.	1	1,500.00	1,500.00
50,000 Gal. Storage Tank	EA.	1	50,000.00	50,000.00
Pump House and Pump Facilities	L.S.	1	25,000.00	25,000.00
Electrical Controls	L.S.	1	5,000.00	5,000.00
Plant Piping	L.S.	1	5,000.00	5,000.00
Fencing	L.F.	300	9.00	2,700.00

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WATER DISTRIBUTION CONSTRUCTION COSTS \$480,205.00

CARRIZO HILLS  
WATER SYSTEM IMPROVEMENTS

TOTAL WATER DISTRIBUTION CONSTRUCTION COSTS:

Water Supply	-0-	
Distribution System	\$480,205	
Contingency	24,010	
		<hr/>
Total Construction Cost	\$504,215	
Engineering	46,820	
Financial	-0-	
Legal	4,802	
Administration	9,604	
Land	-0-	
Other	-0-	
		<hr/>
<u>TOTAL PROJECT COST</u>	<u>\$565,441</u>	

**TOWN OF CATARINA**  
**WATER SYSTEM IMPROVEMENTS**

**Cost Estimate:**

The town of Catarina has an antiquated privately owned water distribution system. The distribution system is in desperate need of major improvements and repairs and the owner is reluctant to make any capital improvement expenditures. It is our recommendation to construct a new water distribution system to be publicly owned and operated. The proposed water system improvements will consist of a water well, distribution lines, fire hydrants and a ground storage tank with pump facilities.

TOWN OF CATARINA  
WATER SYSTEM IMPROVEMENTS

<u>Description</u>	<u>Unit</u>	<u>Quantity</u>	<u>Unit Price</u>	<u>Amount</u>
8" Water Line	L.F.	3,780	\$ 11.00	\$ 41,580.00
6" Water Line	L.F.	28,900	8.00	231,200.00
8" Gate Valve	EA.	6	525.00	3,150.00
6" Gate Valve	EA.	30	325.00	9,750.00
Fire Hydrants	EA.	58	1,350.00	78,300.00
8" Bore & Case	L.F.	240	75.00	18,000.00
6" Bore & Case	L.F.	80	65.00	5,200.00
3/4" Service Line	L.F.	2,280	4.00	9,120.00
5/8" Water Meter	EA.	76	65.00	4,940.00
Water Meter Assembly	EA.	76	60.00	4,560.00
Service Taps	EA.	76	45.00	3,420.00
Air Release Valve	EA.	3	650.00	1,950.00
Cast Iron Fittings	TON	6	2,000.00	12,000.00
Hydrostatic Testing	L.S.	1	5,000.00	5,000.00
Drill Water Well	EA.	1	80,000.00	80,000.00
Deep Well Pump	EA.	1	25,000.00	25,000.00
50,000 Gal. Storage Tank	EA.	1	50,000.00	50,000.00
Pump House and Pump Facility	L.S.	1	25,000.00	25,000.00
Chlorination Facility	L.S.	1	3,000.00	3,000.00



TOWN OF CATARINA

WATER SYSTEM IMPROVEMENTS

<u>Description</u>	<u>Unit</u>	<u>Quantity</u>	<u>Unit Price</u>	<u>Amount</u>
Plant Piping	L.S.	1	\$5,000.00	\$ 5,000.00
Electrical Controls	L.S.	1	3,000.00	3,000.00
Fencing	L.F.	300	9.00	2,700.00

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WATER DISTRIBUTION CONSTRUCTION COSTS \$513,870.00

WATER SUPPLY CONSTRUCTION COSTS \$108,000.00

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CONSTRUCTION COSTS \$621,870.00

TOWN OF CATARINA  
WATER SYSTEM IMPROVEMENTS

TOTAL WATER DISTRIBUTION CONSTRUCTION COSTS:

Water Supply	\$108,000	
Distribution System	513,870	
Contingency	31,094	
		_____
Total Construction Cost	\$652,964	
Engineering	54,414	
Financial	-0-	
Legal	6,219	
Administration	12,438	
Land	10,000	
Other	-0-	
		_____
<u>TOTAL PROJECT COST</u>		<u>\$736,035</u>

**CITY OF CHULA VISTA**  
**WATER SYSTEM IMPROVEMENTS**

**Cost Estimate:**

This colonia consists of two (2) areas being the River Spur area and the Chula Vista subdivision; both being almost two (2) miles South of the city limits of Crystal City. The area has a limited water supply being a two (2") inch line serving a few residences. The total area needs a water distribution system with fire hydrants and a ground storage tank with pumping facilities. The water supply source will be the municipal water system of the City of Crystal City.

CITY OF CHULA VISTA  
WATER SYSTEM IMPROVEMENTS

<u>Description</u>	<u>Unit</u>	<u>Quantity</u>	<u>Unit Price</u>	<u>Amount</u>
6" Water Line	L.F.	25,200	\$ 8.00	\$201,600.00
6" Gate Valve	EA.	40	400.00	16,000.00
Fire Hydrants	EA.	43	1,350.00	58,050.00
3/4" Service Line	L.F.	4,600	4.00	18,400.00
5/8" Water Meter	EA.	92	65.00	5,980.00
Water Meter Assembly	EA.	92	60.00	5,520.00
Service Taps	EA.	92	45.00	4,140.00
Air Release Valve	EA.	2	650.00	1,300.00
Cast Iron Fittings	TON	6	2,000.00	12,000.00
Hydrostatic Testing	L.S.	1	1,500.00	1,500.00
6" Bore and Case	L.F.	100	75.00	7,500.00
2" Permanent Blow-Off Valve	EA.	5	500.00	2,500.00
60,000 Gal. Storage Tank	EA.	1	60,000.00	60,000.00
Pump House and Pump Facilities	L.S.	1	30,000.00	30,000.00

WATER DISTRIBUTION CONSTRUCTION COSTS \$334,490.00

WATER SUPPLY CONSTRUCTION COSTS \$90,000.00

CONSTRUCTION COSTS \$424,490.00

CITY OF CHULA VISTA  
WATER SYSTEM IMPROVEMENTS

TOTAL WATER DISTRIBUTION CONSTRUCTION COSTS:

Water Supply	\$ 90,000	
Distribution System	334,490	
Contingency	21,224	
	<hr/>	
Total Construction Cost	\$445,714	
Engineering		41,388
Financial		-0-
Legal		4,245
Administration		8,490
Land		5,000
Other		-0-
		<hr/>
<u>TOTAL PROJECT COST</u>		<u>\$504,837</u>

**LOMA ALTA**  
**WATER SYSTEM IMPROVEMENTS**

**Cost Estimate:**

Loma Alta is a colonia North of the city limits of Crystal City along US Hwy 83. The area has no potable water supply and it is proposed to construct a water distribution system with fire hydrants and a ground storage tank with pumping facilities connected to a proposed water main trunkline. As an alternate, it is proposed to drill a new well with a deep well pump to serve a ground storage tank with a direct in-line pump.

LOMA ALTA

WATER SYSTEM IMPROVEMENTS

<u>Description</u>	<u>Unit</u>	<u>Quantity</u>	<u>Unit Price</u>	<u>Amount</u>
6" Water Line	L.F.	5,050	\$ 8.00	\$40,400.00
6" Gate Valve	EA.	6	400.00	2,400.00
Fire Hydrants	EA.	11	1,350.00	14,850.00
3/4" Service Line	L.F.	1,980	4.00	7,920.00
5/8" Water Meter	EA.	33	65.00	2,145.00
Water Meter Assembly	EA.	33	60.00	1,980.00
Service Taps	EA.	33	45.00	1,485.00
Air Release Valve	EA.	1	650.00	650.00
Cast Iron Fittings	TON	3	2,000.00	6,000.00
Hydrostatic Testing	L.S.	1	1,000.00	1,000.00
Drill New Well	L.S.	1	100,000.00	100,000.00
Deep Well Pump	EA.	1	33,000.00	33,000.00
50,000 Gal. Storage Tank	EA.	1	50,000.00	50,000.00
Pump House and Pump Facility	L.S.	1	30,000.00	30,000.00
Chlorination Facility	EA.	1	7,000.00	7,000.00
Electrical Controls	L.S.	1	5,000.00	5,000.00
Plant Piping	L.S.	1	10,000.00	10,000.00
Fencing	L.F.	400	9.00	3,600.00

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WATER DISTRIBUTION CONSTRUCTION COSTS \$317,430.00

LOMA ALTA  
WATER SYSTEM IMPROVEMENTS

TOTAL WATER DISTRIBUTION CONSTRUCTION COSTS:

Water Supply	-0-	
Distribution System	317,430	
Contingency	15,871	
		<hr/>
Total Construction Cost	\$333,301	
Engineering	30,949	
Financial	-0-	
Legal	3,174	
Administration	6,348	
Land	-0-	
Other	-0-	
		<hr/>
<u>TOTAL PROJECT COST</u>	<u>\$373,772</u>	



**CARRIZO HILLS**  
**SEWER SYSTEM IMPROVEMENTS**

**Cost Estimate:**

The colonia of Carrizo Hills is outside but adjacent to the city limits of the City of Carrizo Springs and does not have any sewage collection system. The topography lends itself to the installation of a gravity flow sewage collection system. There is an existing lift station within 700 feet of the study area. To connect to the lift station may require obtaining an easement from a third party owner. It is proposed to construct a gravity flow sewage collection system with manholes and cleanouts being designed to serve all residential lots in the colonia. The entire collection system will be delivering to an existing lift station which is owned and operated by the City of Carrizo Springs. The wastewater will then be pumped to a manhole located on State Hwy 85 then flowing by gravity to the existing municipal wastewater treatment plant.

CARRIZO HILLS

SEWER SYSTEM IMPROVEMENTS

<u>Description</u>	<u>Unit</u>	<u>Quantity</u>	<u>Price</u>	<u>Amount</u>
6" Sanitary Sewer	L.F.	24,180	\$ 13.00	\$314,340.00
Sanitary Sewer Manhole	EA.	58	1,400.00	81,200.00
Sewer Appurtenances	L.S.	1	30,000.00	30,000.00

WASTEWATER COLLECTION CONSTRUCTION COSTS \$425,540.00

CARRIZO HILLS  
SEWER SYSTEM IMPROVEMENTS

TOTAL WASTEWATER COLLECTION CONSTRUCTION COSTS:

STP	-0-
Collection System	425,540
Contingency	21,277
	<hr/>
Total Construction Cost	\$446,817
Engineering	43,565
Financial	-0-
Legal	4,468
Administration	8,936
Land	5,000
Other	-0-
	<hr/>
<u>TOTAL PROJECT COST</u>	<u>\$508,786</u>

**CATARINA**

**SEWER SYSTEM IMPROVEMENTS**

**Cost Estimate:**

The town of Catarina has no existing sewage collection system and it is proposed to install a gravity flow system to serve all lots within the populated area. The gravity flow collection system will flow to a main trunkline for delivery to a wastewater treatment plant consisting of facultative and aerobic ponds then the final effluent discharge will be to an unnamed tributary to the San Roque Creek then delivery to the Nueces River.

CATARINA

SEWER SYSTEM IMPROVEMENTS

<u>Description</u>	<u>Unit</u>	<u>Quantity</u>	<u>Price</u>	<u>Amount</u>
6" Sanitary Sewer	L.F.	23,770	\$ 13.00	\$309,010.00
10" Sanitary Sewer	L.F.	1,350	17.00	22,950.00
Sanitary Sewer Manhole	EA.	57	1,400.00	79,800.00
Sewer Appurtenances	L.S.	1	30,000.00	30,000.00

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WASTEWATER COLLECTION CONSTRUCTION COSTS \$441,760.00

WASTEWATER TREATMENT CONSTRUCTION COSTS \$200,000.00

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CONSTRUCTION COSTS \$641,760.00

CATARINA

SEWER SYSTEM IMPROVEMENTS

TOTAL WASTEWATER COLLECTION CONSTRUCTION COSTS:

STP	\$200,000	
Collection System	441,760	
Contingency	32,088	
		<hr/>
Total Construction Cost	\$673,848	
Engineering	58,962	
Financial	-0-	
Legal	6,738	
Administration	13,477	
Land	20,000	
Other	-0-	
		<hr/>
<u>TOTAL PROJECT COST</u>		<u>\$773,025</u>

**BATESVILLE**

**SEWER SYSTEM IMPROVEMENTS**

**Cost Estimate:**

The town of Batesville has no existing sewage collection system and it is proposed to install a gravity flow system to serve all residential development along FM 117 and US Hwy 57 and also along the old Loma Vista Road. The gravity flow network of sewers will deliver to a trunkline to the West of Batesville to a wastewater treatment plant consisting of facultative and aerobic ponds which will discharge to the Gallina Slough being a tributary of the Leona River.

**BATESVILLE**

**SEWER SYSTEM IMPROVEMENTS**

<u>Description</u>	<u>Unit</u>	<u>Quantity</u>	<u>Price</u>	<u>Amount</u>
8" Sanitary Sewer	L.F.	36,300	\$ 15.00	\$544,500.00
10" Sanitary Sewer	L.F.	4,900	17.00	83,300.00
Sanitary Sewer Manhole	EA.	65	1,400.00	91,000.00
Cleanouts	EA.	26	150.00	3,900.00
Sewer Appurtenances	L.S.	1	100,000.00	100,000.00

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WASTEWATER COLLECTION CONSTRUCTION COSTS \$822,700.00

WASTEWATER TREATMENT CONSTRUCTION COSTS \$250,000.00

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CONSTRUCTION COSTS \$1,072,700.00



BATESVILLE  
SEWER SYSTEM IMPROVEMENTS

TOTAL WASTEWATER COLLECTION CONSTRUCTION COSTS:

STP	\$250,000	
Collection System	822,700	
Contingency	53,635	
		_____
Total Construction Cost	\$1,126,335	
Engineering		92,924
Financial		-0-
Legal		11,263
Administration		22,526
Land		40,000
Other		-0-
		_____
<u>TOTAL PROJECT COST</u>		<u>\$1,293,048</u>

**CHULA VISTA**  
**SEWER SYSTEM IMPROVEMENTS**

**Cost Estimate:**

This colonia has no existing sewage collection system and it is proposed to install a gravity flow collection system to the Southeast corner of this subdivision. It is proposed to install a packaged wastewater treatment plant with a capacity of 90,000 gallons per day. The area is adjacent to the Espantosa Slough being a tributary of the Nueces River. The proximity of the area to the tributary makes it impossible to use a facultative and aerobic pond type of wastewater treatment plant. The installation of a packaged wastewater treatment plant will deliver an effluent to the tributary that will meet the discharge permit requirements as set by the Texas Water Commission. The proposed gravity flow collection system will serve all residential lots within the subdivision and will have the necessary manholes and cleanouts and other appurtenances as required.

CHULA VISTA

SEWER SYSTEM IMPROVEMENTS

<u>Description</u>	<u>Unit</u>	<u>Quantity</u>	<u>Unit Price</u>	<u>Amount</u>
6" Sanitary Sewer	L.F.	20,180	\$ 13.00	\$262,340.00
Sanitary Sewer Manhole	EA.	51	1,400.00	71,400.00
Cleanouts	EA.	7	150.00	1,050.00
Sewer Appurtenances	L.S.	1	75,000.00	75,000.00

WASTEWATER COLLECTION CONSTRUCTION COSTS \$409,790.00

WASTEWATER TREATMENT CONSTRUCTION COSTS \$240,000.00

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CONSTRUCTION COSTS \$649,790.00

CHULA VISTA  
SEWER SYSTEM IMPROVEMENTS

TOTAL WASTEWATER COLLECTION CONSTRUCTION COSTS:

STP	240,000	
Collection System	409,790	
Contingency	32,490	
		_____
Total Construction Cost	\$682,280	
Engineering	59,700	
Financial	-0-	
Legal	6,823	
Administration	13,646	
Land	10,000	
Other	-0-	
		_____
<u>TOTAL PROJECT COST</u>		<u>\$772,449</u>

**LA PRYOR**

**SEWER SYSTEM IMPROVEMENTS**

**Cost Estimate:**

The town of La Pryor has an excellent water distribution system that could be complemented with an adequate wastewater collection and treatment system. Presently there is no sewage collection system and no wastewater treatment facilities. It is proposed to install a gravity flow sewage collection system flowing in a Southerly direction to a collection outfall main delivering to a facultative and anaerobic pond type wastewater treatment plant which will then discharge to a tributary of the Nueces River. The proposed sewage collection system will serve all of the populated areas of La Pryor and the system will require the construction of manholes, cleanouts and underground borings with casings across all major highways and farm to market roads.

LA PRYOR

SEWER SYSTEM IMPROVEMENTS

<u>Description</u>	<u>Unit</u>	<u>Quantity</u>	<u>Unit Price</u>	<u>Amount</u>
6" Sanitary Sewer	L.F.	47,520	\$ 13.00	\$617,760.00
8" Sanitary Sewer	L.F.	17,040	15.00	255,600.00
10" Sanitary Sewer	L.F.	4,100	17.00	69,700.00
Sanitary Sewer Manhole	EA.	128	1,400.00	179,200.00
Cleanouts	EA.	45	150.00	6,750.00
8" Bore and Case	L.F.	460	75.00	34,500.00
Sewer Appurtenances	L.S.	1	75,000.00	75,000.00

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WASTEWATER COLLECTION CONSTRUCTION COSTS \$1,238,510.00

WASTEWATER TREATMENT CONSTRUCTION COSTS \$200,000.00

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CONSTRUCTION COSTS \$1,438,510.00

LA PRYOR

SEWER SYSTEM IMPROVEMENTS

TOTAL WASTEWATER COLLECTION CONSTRUCTION COSTS:

STP	\$200,000	
Collection System	1,238,510	
Contingency	71,926	
		_____
Total Construction Cost	\$1,510,436	
Engineering		124,611
Financial		-0-
Legal		15,104
Administration		30,208
Land		40,000
Other		-0-
		_____
<u>TOTAL PROJECT COST</u>		<u>\$1,720,359</u>

**LOMA ALTA**

**SEWER SYSTEM IMPROVEMENTS**

**Cost Estimate:**

Loma Alta is a colonia North of the city limits of Crystal City and has no water supply and/or sewage collection or treatment facilities. The City of Crystal City is proposing to extend a major sewage collection trunkline to the North of the City of Crystal City along the East right-of-way of FM 393 (old US Hwy 83) approximately four (4) miles North. The proposed sewer collection system will flow to the West across US Hwy 83 and to FM 393 (old Hwy 83) and connect to the proposed sewer trunkline that flows to the existing Crystal City wastewater treatment plant. The sewer collection system will contain the necessary manholes and appurtenances required to serve every lot within this colonia.



LOMA ALTA

SEWER SYSTEM IMPROVEMENTS

<u>Description</u>	<u>Unit</u>	<u>Quantity</u>	<u>Price</u>	<u>Amount</u>
6" Sanitary Sewer	L.F.	5,100	\$ 13.00	\$66,300.00
8" Sanitary Sewer	L.F.	880	15.00	13,200.00
Sanitary Sewer Manhole	EA.	17	1,400.00	23,800.00
8" Bore and Case	L.F.	120	75.00	9,000.00
Sewer Appurtenances	L.S.	1	20,000.00	20,000.00

WASTEWATER COLLECTION CONSTRUCTION COSTS \$132,300.00

LOMA ALTA

SEWER SYSTEM IMPROVEMENTS

TOTAL WASTEWATER COLLECTION CONSTRUCTION COSTS:

STP	-0-
Collection System	132,300
Contingency	6,615
	<hr/>
Total Construction Cost	\$138,915
Engineering	17,364
Financial	-0-
Legal	1,389
Administration	2,778
Land	N/A
Other	-0-
	<hr/>
<u>TOTAL PROJECT COST</u>	<u>\$160,446</u>

TOTAL PROJECT COST ESTIMATES SUMMARY

WATER IMPROVEMENTS

Asherton	\$426,547
Big Wells	\$395,299
Carrizo Hills	\$565,441
Catarina	\$736,035
Chula Vista	\$504,837
Loma Alta	\$373,772

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TOTAL WATER IMPROVEMENTS: \$3,001,931

SEWER IMPROVEMENTS

Carrizo Hills	\$508,786
Catarina	\$773,025
Batesville	\$1,293,048
Chula Vista	\$772,449
La Pryor	\$1,720,359
Loma Alta	\$160,446

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TOTAL SEWER IMPROVEMENTS: \$5,228,113

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**POPULATION CHARACTERISTICS OF  
DIMMIT AND ZAVALA COUNTIES**

**Planning Requirements:**

An important tool in planning for future needs is a population projection for the county and the urban area adjacent to any "colonia". In planning for utility improvements such as water and sewer, it is important to establish a design period and project a population number. The population number sets the pattern for design of water lines, fire protection requirements and also for sizing sewer lines and wastewater treatment plant capacity.

There are several basic factors that have a direct effect on population forecasting and they are: a depression, war, large scale industrial development, epidemic and the availability of a water source. The shifts in population are caused by attraction due to climate conditions, attitude of the community, better economic opportunities, better housing conditions and/or reasons of health or retirement.

The most important factor in population is the attitude of the community. In the area of Dimmit and Zavala Counties, the economy has remained static and continues to be generated by the increase of the local labor pool which in turn multiplies the dollar spent locally. An improved highway system is a great benefit to broaden job opportunities. If an area is a desirable

place to live, then it will hold its population and attract others to live there. The attitude of people has the greatest influence in attracting others and even overcoming poor housing and/or poor economic opportunities.

**Population Data - Dimmit and Zavala Counties:**

To project the future, it is wise to know what the previous population patterns have been for Dimmit and Zavala Counties. We have researched the U.S. Census records and we have obtained population data for both counties as of 1900. The census data records denote that population records for Carrizo Springs and Crystal City were initially recorded in the year 1920.

The County population data as obtained has been recorded from 1900 till 1980 and is shown in Table 1. The existing population and the projections to the year 2020 have been calculated and plotted. The parameters for forecasting have been the following assumptions: the average household is 3.3 persons, the number of households has been set by the number of electrical and/or water connections, and the number of households has been verified by an actual physical count of all residences.

A geometric projection was utilized to forecast the maximum future population, assuming that future patterns will continue at the same rate as it has occurred since 1970. From 1930 to 1970 both counties have been in a population flux and have had erratic ups and downs in their population data reports. From all data gathered, both counties have stabilized and the population has experienced a steady increase in growth.

This geometric projection for each study area will be based on a trend for the past 20 years. It will give us a projected population figure that will relate to the local urban areas such

as Crystal City and Carrizo Springs and also relate to the regional influence of the counties.

To determine a numerical projection, the minimum projection has been combined with a base level population for the year 1970 and projected to the year 2020. It is evident that the growth for Dimmit County will continue to exceed the growth pattern for Zavala County. By the year 2020 Dimmit County is forecast to have a population of 22,058 and Zavala County is forecast to have a population of 14,065, this growth being near 50% of the population of Zavala County. It is evident that Dimmit County is growing at a faster rate than Zavala County.



**Population Data - Cities/Towns:**

From the U.S. Census data we have obtained historical population data for the two large prominent urban areas, one in each county being Carrizo Springs in Dimmit County and Crystal City in Zavala County. We have obtained data on these two cities from 1920 to 1980. We have also obtained sporadic data for La Pryor, Big Wells, Asherton and Batesville from 1960 to 1980. See Table 8 for a tabulation of Cities/Towns population as extracted from U.S. Census data.

The census data has been plotted and an average projection has been utilized to forecast a population. For Carrizo Springs and Crystal City, the census population for the year 1970 has been set as a benchmark and all forecasts based on data from the year 1970 to 1989.

In combining the census data available and a percentage increase per year based on the average population forecast from 1990 to the year 2020 then a forecast maximum and minimum population is determined for each study area.

From the census information, it is apparent that La Pryor and Big Wells are showing a slight growth pattern while Asherton, Batesville and Catarina seem to be static and/or loosing population. It is quite evident that the introduction of water and sewer utilities will make a significant change in population trend.

**TABLE 1**

**CENSUS POPULATION FOR DIMMIT AND ZAVALA COUNTIES**

<b>County</b>	<b>1990</b>	<b>1910</b>	<b>1920</b>	<b>1930</b>	<b>1940</b>	<b>1950</b>	<b>1960</b>	<b>1970</b>	<b>1980</b>
<b>Dimmit</b>	<b>1,106</b>	<b>3,400</b>	<b>5,296</b>	<b>8,828</b>	<b>8,542</b>	<b>10,654</b>	<b>10,095</b>	<b>9,039</b>	<b>11,666</b>
<b>Zavala</b>	<b>792</b>	<b>1,889</b>	<b>3,108</b>	<b>10,349</b>	<b>11,603</b>	<b>11,201</b>	<b>12,696</b>	<b>11,370</b>	<b>12,031</b>

TABLE 2

GEOMETRIC PROJECTION OF POPULATION  
DIMMIT COUNTY

<u>YEAR</u>	<u>MAXIMUM POPULATION</u>	<u>% CHANGE</u>
1970	9039	+25.8%
1980	11,367	+20.0%
1990	13,641	+20.0%
2000	16,369	+20.0%
2010	19,643	+20.0%
2020	23,572	+20.0%

TABLE 3

GEOMETRIC PROJECTION OF POPULATION  
ZAVALA COUNTY

<u>YEAR</u>	<u>MAXIMUM POPULATION</u>	<u>% CHANGE</u>
1970	11,370	2.6%
1980	11,666	6.4%
1990	12,409	4.5%
2000	12,967	4.5%
2010	13,551	4.5%
2020	14,160	4.5%

TABLE 4

NUMERICAL PROJECTION OF POPULATION  
DIMIT COUNTY

<u>YEAR</u>	<u>POPULATION</u>	<u>MINIMIM INCREASE/10 YEARS</u>	<u>PROJECTION</u>
1970	9,039	+ 2,627	-
1980	11,666	+ 1,975	-
1990	13,641	+ 2,301 avg.	-
2000	-	+ 2,301 avg.	15,942
2010	-	+ 2,301 avg.	18,243
2020	-	+ 2,301	20,544

TABLE 5

NUMERICAL PROJECTION OF POPULATION  
ZAVALA COUNTY

<u>YEAR</u>	<u>POPULATION</u>	<u>MINIMIM</u> <u>INCREASE/10 YEARS</u>	<u>PROJECTION</u>
1970	11,370	+ 661	-
1980	12,031	+ 378	-
1990	12,409	+ 520 avg.	-
2000	-	+ 520 avg.	12,929
2010	-	+ 520 avg.	13,449
2020	-	+ 520 avg.	13,969

TABLE 6

AVERAGE PROJECTION OF POPULATION  
DIMITT COUNTY

COMBINED MAXIMUM AND MINIMUM

<u>YEAR</u>	<u>MAXIMUM</u>	<u>MINIMUM</u>	<u>AVERAGE PROJECTION</u>
1990	13,641	13,641	13,641
2000	16,369	15,942	16,156
2010	19,643	18,243	18,943
2020	23,572	20,544	22,058

**TABLE 7**

**AVERAGE PROJECTION OF POPULATION**  
**ZAVALA COUNTY**

**COMBINED MAXIMUM AND MINIMUM**

<b><u>YEAR</u></b>	<b><u>MAXIMUM</u></b>	<b><u>MINIMUM</u></b>	<b><u>AVERAGE PROJECTION</u></b>
<b>1990</b>	<b>12,409</b>	<b>12,409</b>	<b>12,409</b>
<b>2000</b>	<b>12,967</b>	<b>12,929</b>	<b>12,948</b>
<b>2010</b>	<b>13,551</b>	<b>13,449</b>	<b>13,500</b>
<b>2020</b>	<b>14,160</b>	<b>13,969</b>	<b>14,065</b>

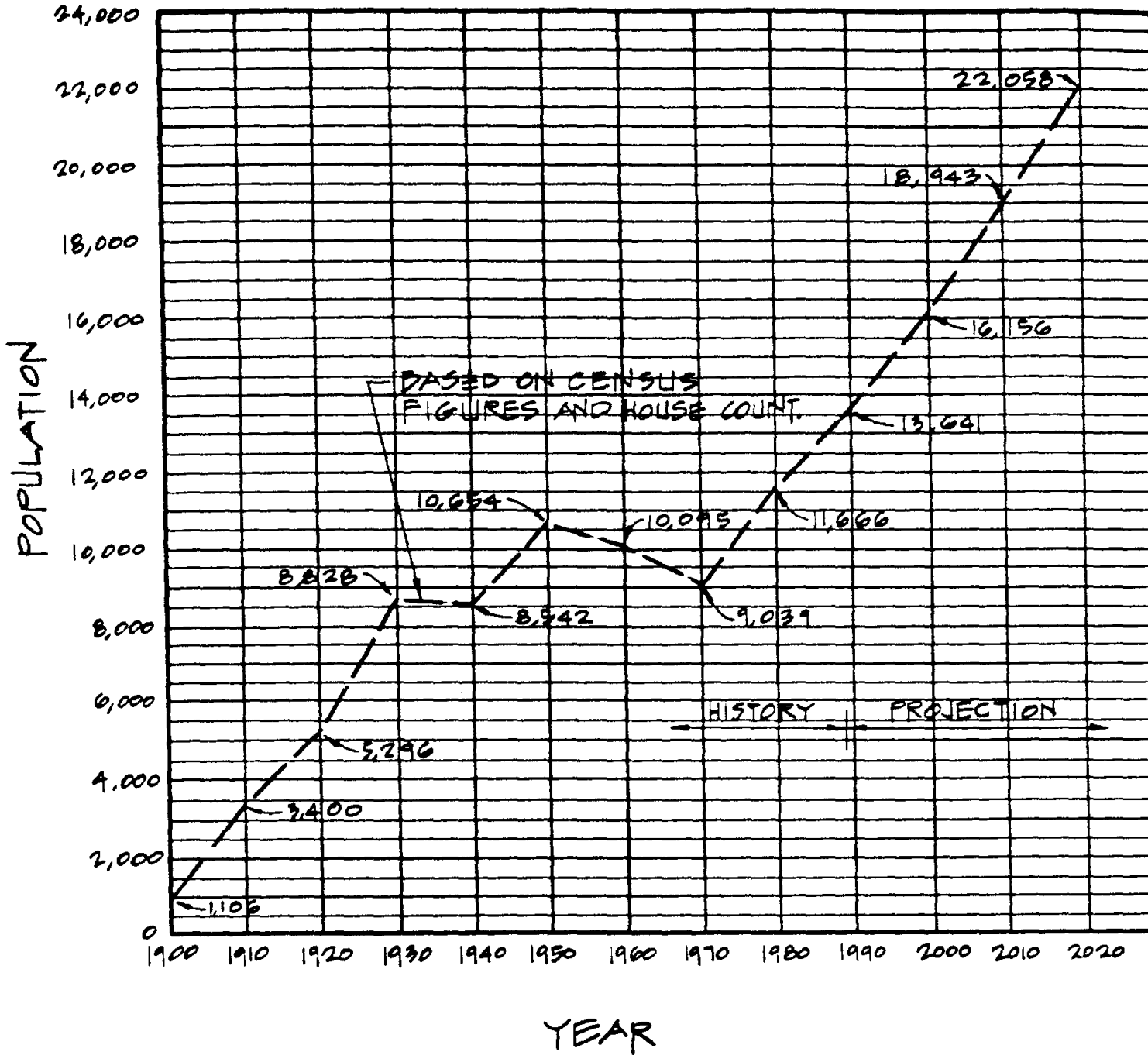


**TABLE 8**

**CENSUS POPULATION FOR CITIES/TOWNS**  
**DIMIT AND ZAVALA COUNTIES**

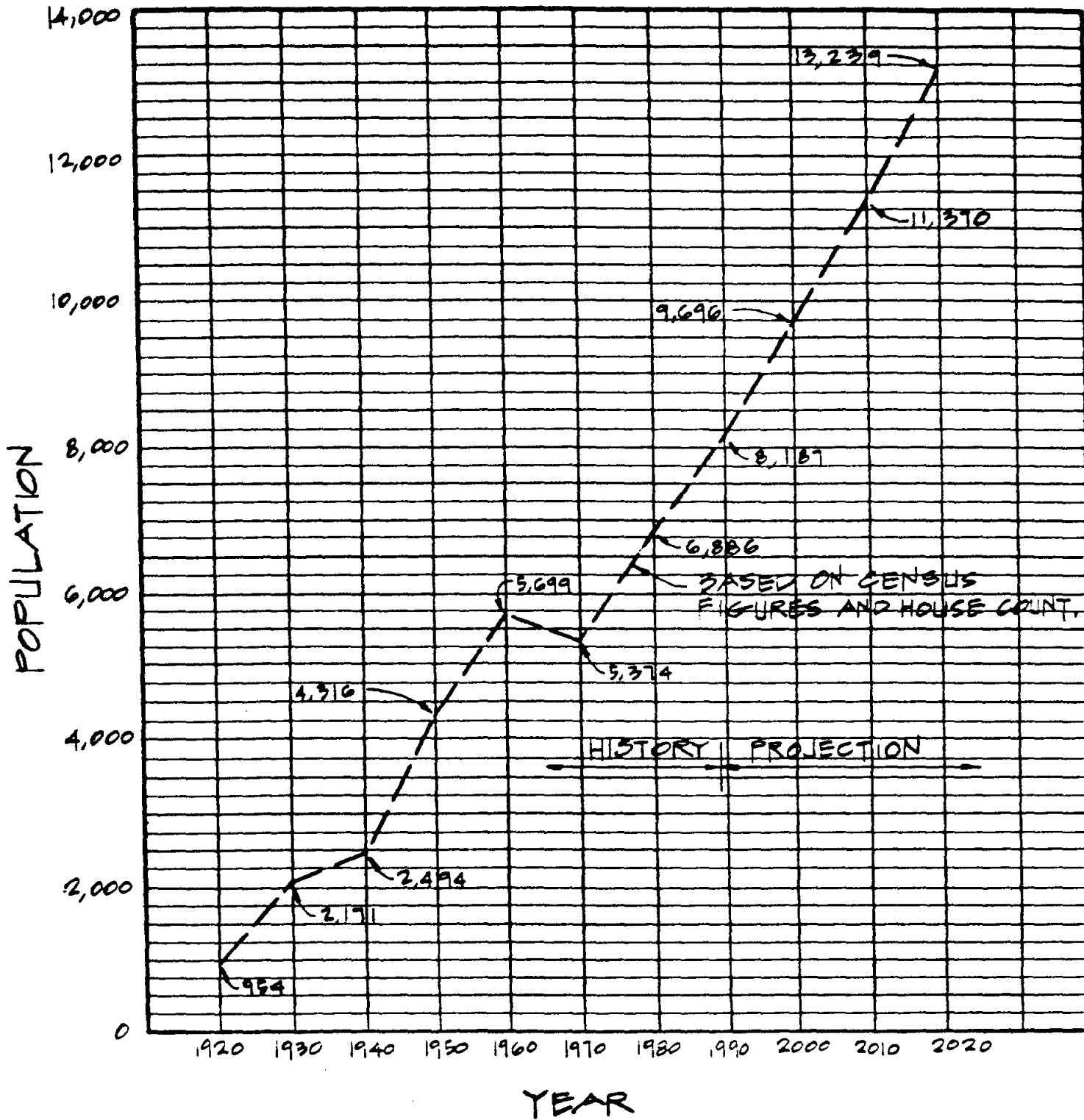
<b>City/Town</b>	<b>1920</b>	<b>1930</b>	<b>1940</b>	<b>1950</b>	<b>1960</b>	<b>1970</b>	<b>1980</b>
<b>Carrizo Springs</b>	<b>954</b>	<b>2,171</b>	<b>2,494</b>	<b>4,316</b>	<b>5,699</b>	<b>5,374</b>	<b>6,886</b>
<b>Crystal City</b>	<b>800</b>	<b>6,609</b>	<b>6,529</b>	<b>7,198</b>	<b>9,108</b>	<b>8,104</b>	<b>8,334</b>
<b>Asherton</b>					<b>1,890</b>	<b>1,645</b>	<b>1,500</b>
<b>Big Wells</b>					<b>801</b>	<b>711</b>	<b>939</b>
<b>Batesville</b>					<b>1,424</b>	<b>1,310</b>	<b>1,178</b>
<b>La Pryor</b>					<b>1,211</b>	<b>1,405</b>	<b>1,574</b>
<b>Catarina</b>					<b>392</b>	<b>420</b>	<b>326</b>

# DIMIT COUNTY



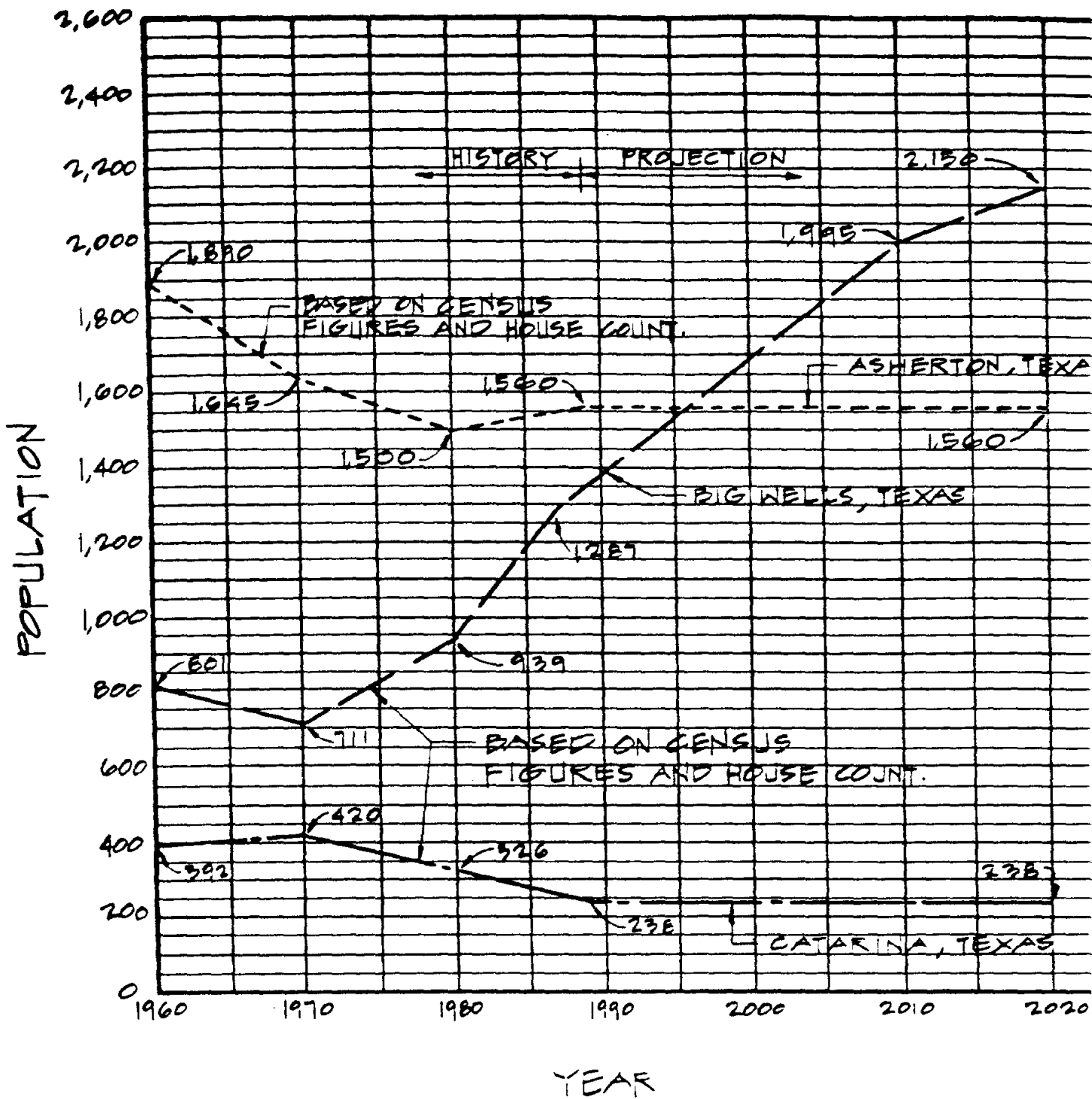
POPULATION PROJECTION ~ 1900 TO 2020

GARRIZO SPRINGS, TEXAS



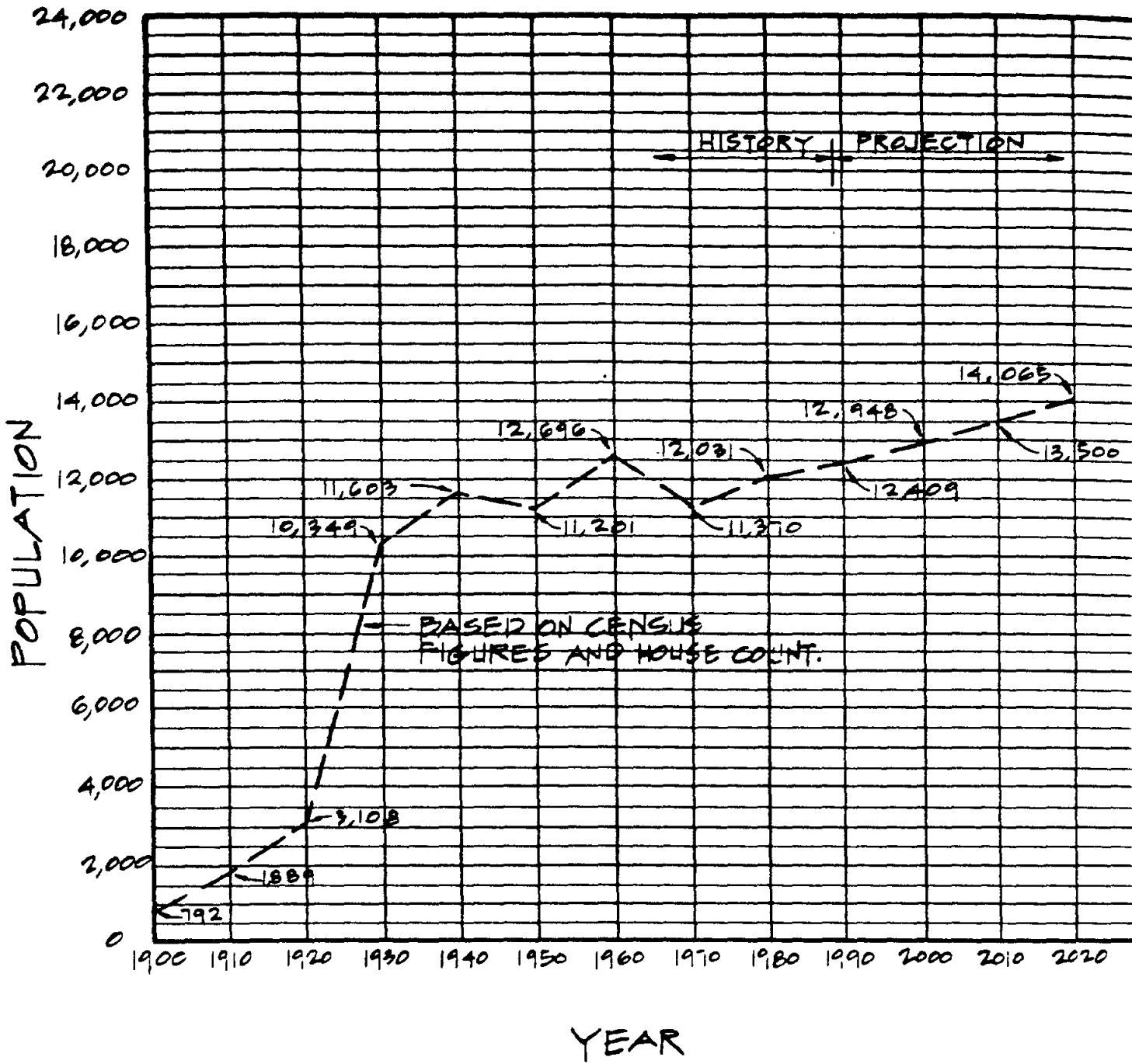
POPULATION PROJECTION ~ 1920 TO 2020

# ASHERTON, BIG WELLS, and CATARINA, TEXAS



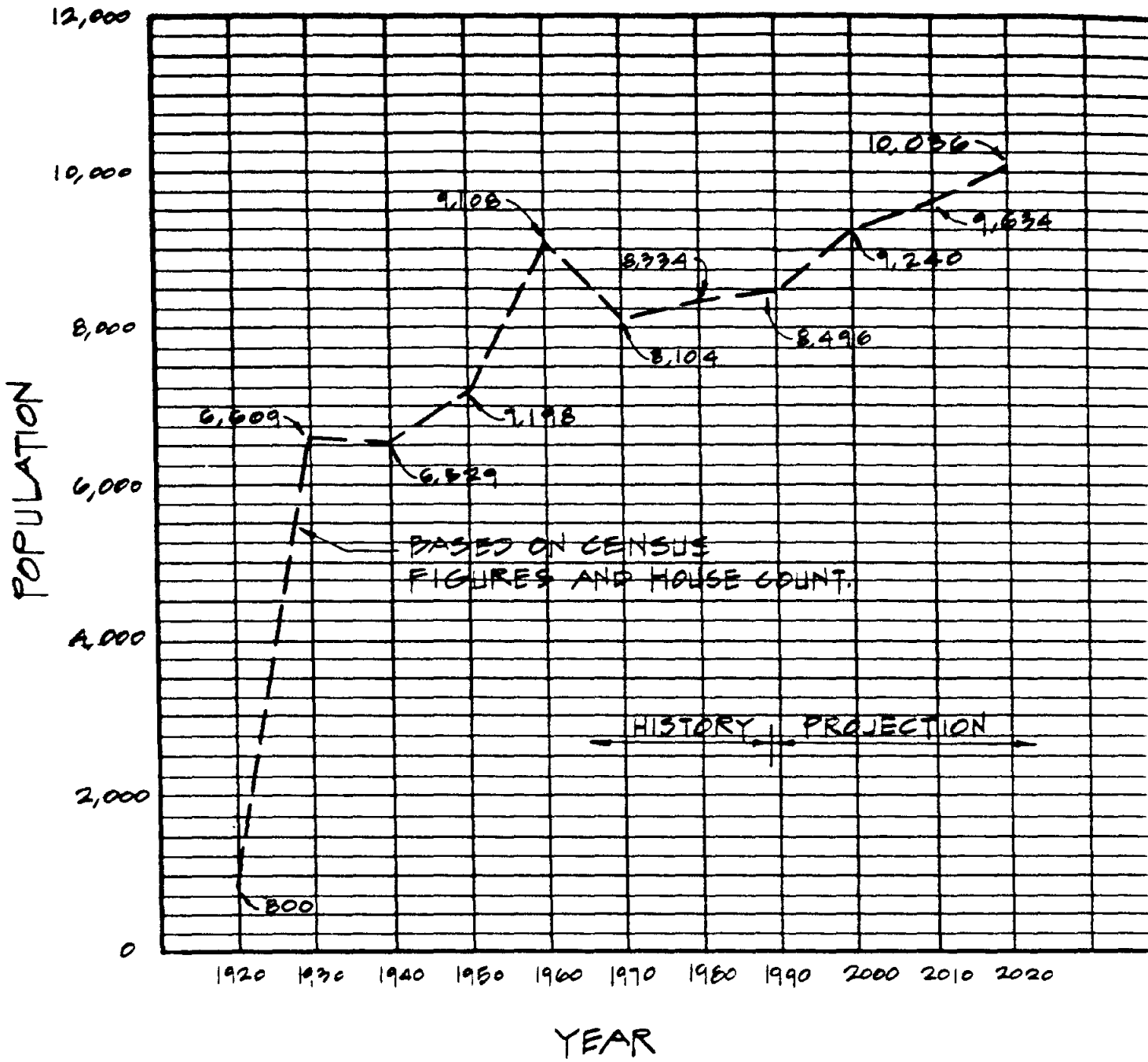
POPULATION PROJECTION ~ 1960 TO 2020

# ZAVALA COUNTY



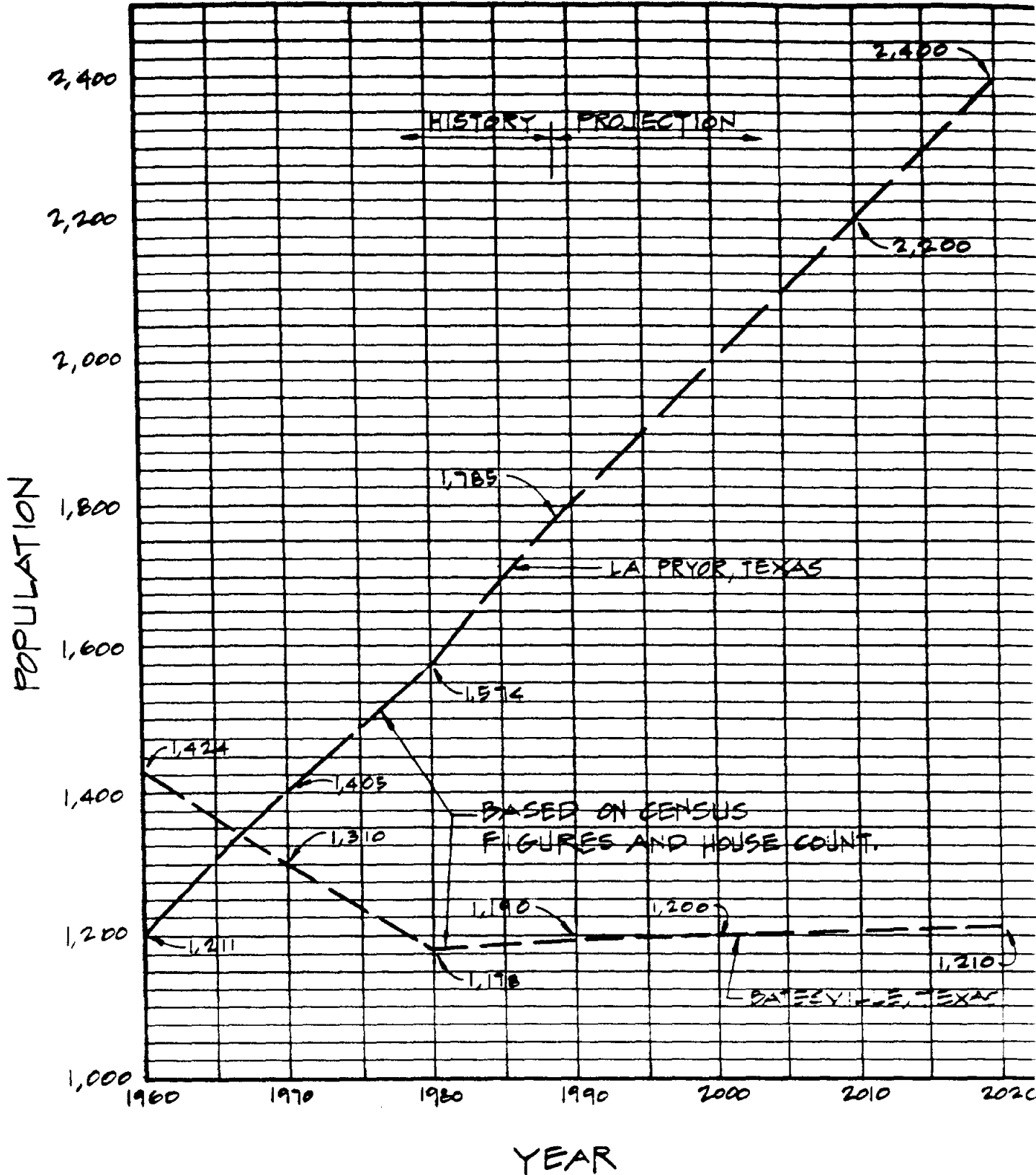
POPULATION PROJECTION ~ 1900 TO 2020

# CRYSTAL CITY, TEXAS



POPULATION PROJECTION ~ 1920 TO 2020

# LA PRYOR and BATESVILLE, TEXAS



POPULATION PROJECTION ~ 1960 TO 2020

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**WATER CONSERVATION PLAN**

In the geographical area of Dimmit and Zavala Counties, water is a very precious commodity. Rainfall is limited and the primary potable water source in the area is the Carrizo-Wilcox Aquifer. The aquifer is over 1,100 feet in depth and electricity for pumping is expensive. The aquifer has an ample water supply, however, the pumping costs are substantial and tend to inflate the water rate charges.

To develop a water conservation plan for both counties will require the enactment of ordinances, the cooperation and awareness of all citizens, and a continuous education program. There are many ideas about how to save water but only a few that can prudently be used in Dimmit and Zavala Counties. Water conservation has to occur inside the home where 80% of water consumption occurs during the winter months and in the lawn or yard area where 80% of water consumption will occur during the summer months. Our summers are very long so we have to concern our conservation both inside and outside the home. Some recommendations for conserving water inside the home are the following:

1. Install low-flow shower heads.
2. Repair all dripping faucets.
3. Install cut-off nozzles in kitchen sink to prevent continuous flow when rinsing or washing dishes.

4. Install a device to displace water in the toilet tank.
5. Eliminate toilet leaks.
6. Run dishwasher and washing machine only with a full load.
7. All eating establishments to serve water only on request.

Other recommendations for conserving water outside the home are the following:

1. Water the lawn only in the morning.
2. Watering Plan: even number addresses on even numbered days and odd number addresses on odd numbered days.
3. Design landscaping using native trees and shrubs that require less watering.
4. Allow car washing with a pail or hose with a flow control nozzle.

**Water Conservation Program:**

The proposed water conservation policy for Dimmit and Zavala Counties is to reduce its water consumption through the implementation of an aggressive water conservation program.

The water conservation policy is briefly described in detail in the following program outline.

**Public and School Education**

- . Water Conservation Education
- . Public Service Announcements
  - Radio
  - Newspapers
  - Neighborhood Associations
- . Mailouts with water and sewer billings

**Ordinances/Regulations**

- . Scheduling of lawn watering
- . Plumbing code amendments
- . Policing of water waste violations

**Water Rates**

- . Water conservation rate structure -
  - Bonus reduction with less usage
- . Promotion/coordination/implementation of water conservation programs

**Technical Assistance**

- . Recommend acceptable shower heads, cut-of base nozzles.
- . Conduct seminars to reduce water usage inside the home, changes to water closet, lavatory, and showers.

It is proposed to implement a five year program for Dimmit and Zavala Counties. The implementation steps for each year are as follows:

**Year One**

- . Begin a Public and School Education Program.
- . Enact Water Conservation Ordinances and Regulations.
- . Develop a program to provide technical assistance to citizens to implement water conservation initiations.

**Year Two**

- . Implement Ordinances and Regulations.
- . Develop a water conservation ordinance enforcement procedure.

**Year Three and Four**

- . Continuation of in-place programs.

**Year Five**

- . Evaluation of Program.
- . Preparation of a County Water Conservation Progress Report.

**The Benefits of Water Conservation**

Water bills that are paid that include water that is wasted represent lost capital that is not being used properly. An effective water conservation program creates an efficient use of water and capital. The benefits derived are less wear and tear on the water production equipment, makes more water available for future development, and reduces the capital outlay requirements for new facilities.



PROJECT IMPLEMENTATION PLAN AND SCHEDULE

The primary reasons for implementation of this plan to provide a water supply and wastewater facilities to all study areas are to control pollution and to have a positive impact effect on the area. We are of the opinion that these improvements will have an effect on the following categories; environmental impact, economical impact and social impact. A brief explanation of each category is presented.

**Environmental Impact:** The addition of a water supply and a wastewater collection system will have an impact on the air quality by improving the state of cleanliness of the ambient air in each study area. The existing air pollutants, caused by pit privies and cesspools, are hazards to health and are damaging to the property and surrounding vegetation. The other important area of impact is the water quality improvement. The implementation of a wastewater treatment plant will be an added improvement of the quality of water being discharged to a receiving stream. The treatment plant will remove runoff pollutants which will improve the overall quality of the surface and underground water supplies. Another important point of impact is the effect on flora and fauna in the study area. The implementation of a water supply and the addition of a wastewater treatment plant will greatly enhance the water quality being

delivered to any receiving stream and will improve the habitat for aquatic life.

**Economical Impact** - The addition of a water supply and sewer facilities to these study areas will enhance the property values and will encourage the development of the area in home building, road improvements, and the elimination of pit privies and cesspools. Population will increase and a tax paying area can exercise a demand for improved services to the study area.

**Social Impact** - The social impact of the extension of a water supply and wastewater treatment facilities, can be measured by the increase of land values, the desire to live in the study area, the elimination of obnoxious pit privies and the improved aesthetics. It is recommended that the implementation of water and sewer services follow the following priorities:

- 1) Colonias in the ETJ of a city shall be given top priority; being Carrizo Hills, Chula Vista and Loma Alta.
- 2) Providing a water supply to each study area has a priority over sewer facilities.
- 3) Each study area is given a priority and the priority is inclusive of water and sewer service as needed.

**Priority Rating**

- A. Carrizo Hills, Chula Vista, Loma Alta
- B. Catarina
- C. Batesville, La Pryor
- D. Big Wells, Asherton

The actual construction of the water and sewer facility as proposed in the suggested priority ratings will require a project implementation schedule that will include the Environmental Review and approval, advertisement and award construction bids, construction, final inspection and project close-out. See Exhibit I-A.

It is our opinion that all construction in Dimmit and Zavala Counties can be accomplished within a 36 month period with projects overlapping and being under construction concurrently. It is also our opinion that if all projects were advertised and awarded at the same time, then construction time could be reduced to a time span of 12 months.



**WATER SUPPLY AND WASTEWATER FACILITY CONSTRUCTION**

**PROJECT IMPLEMENTATION SCHEDULE**

Exhibit I-A

MONTHS

ACTIVITY	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
<u>Water and Sewer Improvements</u>																								
A. Environmental Review	X-X																							
B. Plans & Specs	X	---	X																					
C. State Review			X	---	X																			
D. Advertisement & Award				X	---	X																		
E. Construction						X	---	---	---	---	---	X												
F. Interim/Final Inspection						X	---	---	---	---	X													
G. Program Audit & Close-Out											X	---	X											
H. General Administration	X	---	---	---	---	---	---	---	---	---	---	---	X											

<b>CONTRACT EXECUTION DATE</b>

<b>CONTRACT ENDING DATE</b>



**FINANCIAL PLAN TO IMPLEMENT RECOMMENDED ALTERNATIVES**

In developing a financial strategy plan for each study area, we have prudently considered that 80% of the funding will be from grants and the remaining 20% being the local share that may be obtained through low interest bearing loans. It is anticipated that the grant funds will come from funds being appropriated by the State of Texas and the US Government and specifically designated as funds for water supply and wastewater facilities; the local share being a low interest loan to the study area to be repaid by each water user. It is proposed to limit the billing to each individual water consumer to a monthly charge not to exceed a range of \$25.00 to \$35.00 dollars per month for water and sewer services.

There are several state and federal agencies that can be approached for providing funding for the proposed water and sewer improvements in the study area. The list is the following:

State Revolving Fund - Texas Water Development Board  
Farmers Home Administration  
Economic Development Administration  
Environmental Protection Agency  
Texas Department of Commerce

All of these agencies fund water and sewer projects. The only agencies that make low interest loans to public bodies are:

Texas Water Development Board

Farmers Home Administration

The others make grants available to responsible political entities through a competitive qualification process.

It is recommended that each county unit of government be the applicant for all unincorporated areas and create a non-profit water or sewer district for each study area. Each water or sewer district office will have the responsibility to operate the sewer or water facilities, maintain and collect the monthly bills for amortizing any loan obtained to construct said facilities.

It is our recommendation that one single debt service rate be charged to cover the indebtedness of the countryside water and sewer improvements. This method would provide some relief to the small and sparsely populated areas such as Carrizo Hills, Catarina, Loma Alta and Chula Vista. The heavy burden would be divided to the more populated areas such as La Pryor, Batesville, Asherton and Big Wells.

A table has been prepared showing the total cost of proposed improvements, assessing the local share to be 20% supported by a low interest loan from Texas Water Development Board or Farmers Home Administration for 40 years, at a 5.75% interest rate. This table is based on present number of households and shows a debt

service charge per month and also indicates the charges for an average water bill for 10,000 gallons per month and an average sewer service bill. It is the intent of the colonias project to have a monthly water and sewer bill, per household, in the range of \$25.00 to \$35.00 per month.

Table 9

DIMIT AND ZAVALA COUNTIES  
COST ESTIMATES OF PROPOSED IMPROVEMENTS

<u>Study Area</u>	<u>Sewer Costs</u>	<u>Water Costs</u>
Carrizo Hills	\$ 508,786	\$565,441
Catarina	\$ 773,025	\$736,035
Batesville	\$ 1,293,048	-0-
Chula Vista	\$ 772,449	\$504,837
La Pryor	\$ 1,720,359	-0-
Loma Alta	\$ 160,446	\$373,772

Table 10

## MONTHLY COSTS FOR WATER AND SEWER SERVICE BY STUDY AREA

<u>Study Area</u>	<u>Homes</u>	<u>Water &amp; Sewer Total Costs</u>	<u>20% Local Share</u>	<u>Debt Service</u>	<u>10,000 GPM Average Residential Water Bill</u>	<u>Average Residential Sewer Bill</u>	<u>Approximate Total</u>
<b><u>DIPMUT COUNTY</u></b>							
Asherton (Water)	520	\$ 426,547	\$ 85,309	\$ 0.92	\$14.62	\$7.50	\$23.04
Big Wells (Water)	269	\$ 335,710	\$ 67,142	\$ 1.40	\$12.60	\$7.50	\$21.50
Carrizo Hills (Water/Sewer)	120	\$1,074,227	\$214,845	\$10.03	\$11.95	\$6.00	\$27.98
Catarina (Water/Sewer)	72	\$1,509,060	\$301,812	\$23.51	\$ 7.00	\$4.00*	\$34.51
<b><u>ZAVALA COUNTY</u></b>							
Batesville (Sewer)	357	\$1,293,048	\$258,610	\$ 4.07	\$20.00	\$4.00*	\$28.07
Chula Vista (Water/Sewer)	98	\$1,277,286	\$255,457	\$14.64	\$11.78	\$7.85	\$34.27
La Pryor (Sewer)	541	\$1,720,359	\$344,072	\$ 3.58	\$11.75	\$4.00*	\$19.33
Loma Alta (Water/Sewer)	32	\$ 534,218	\$106,844	\$18.63	\$11.78	\$7.85	\$38.26

\* Average Bill of \$7.50/mo includes O&M plus Financing.